

Application No. 10/008,945  
Amendment dated: August 14, 2003  
Reply to Office Action dated: May 14, 2003

MTS-328505

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A method of producing electrodes for a battery; characterized by comprising the steps of:

processing a metal foil to include at least one of a plurality of concavities and convexities, thereby forming a current collector having a thickness larger than a thickness of the unprocessed metal foil;

applying an active material layer on both sides of a the current collector using a pair of dies, which is obtained by subjecting a metal foil to three dimensional processing and has a thickness larger than that of the metal foil, by using a pair of dies;

drying the active material layer; and

pressing the active material layer.

2. (Currently Amended) The method of producing electrodes for a battery according to claim 1,

wherein characterized in that the thickness of said metal foil is in a range of 5 to 50  $\mu\text{m}$ .

3. (Currently Amended) The method of producing electrodes for a battery according to claim 1,

wherein characterized in that the thickness of the current collector having been subjected to the three dimensional processing step falls in the range shown by the equation  $t_1 \geq t_2 \geq t_1/4$ , when  $t_1$  is the thickness of a electrode plate and  $t_2$  is the thickness of the current collector having been subjected to the three dimensional processing step.

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4. (Currently Amended) The method of producing electrodes for a battery according to claim 1,

~~wherein characterized in that~~ the thickness of the current collector having been subjected to the three-dimensional processing step falls in the range shown by the equation  $d > t_2 \geq d/4$ , when  $d$  is the gap between the tips of the pair of dies and  $t_2$  is the thickness of the current collector having been subjected to the three-dimensional processing step.

5. (Currently Amended) The method of producing electrodes for a battery according to claim 1,

~~wherein characterized in that~~ said metal foil is electrolytic nickel foil.

6. (Currently Amended) A method of producing electrodes for a battery ~~in which an active material coating for nickel-hydrogen battery is applied on a current collector using dies so as to form an active material layer, comprising the steps of:~~

processing a metal foil to include at least one of a plurality of concavities and convexities, thereby forming a current collector having a thickness larger than a thickness of the unprocessed metal foil; and

characterized in applying an active material on both sides of the current collector using a pair of dies such that the active material coating flows inside the dies as well as between the tip of each die and the current collector at a shear rate of 500 (1/sec) or less.

7. (Currently Amended) The method of producing electrodes for a battery according to claim 1 or 6,

~~wherein characterized in that~~ the pressure of the active material coating between the tip of each die and the current collector is 0.5 MPa or lower.

8. (Currently Amended) The method of producing electrodes for a battery according to claim 1 or 6,

~~wherein characterized in that~~ the difference in thickness between the active material layer applied to ~~of the front and applied to that of the back of the current collector is within the limits of  $\pm 30\%$ .~~

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9. (Currently Amended) The method of producing electrodes for a battery according to claim 1 or 6,

~~wherein characterized in that~~ the difference in thickness between the active material layer ~~applied to~~ of the front and ~~applied to~~ that of the back of the current collector is within the limits of  $\pm 10\%$ .

10. (New) An electrode for a battery comprising:

a current collector formed of a metal foil, said metal foil including at least one of a plurality of concavities and convexities, said current collector having a thickness larger than a thickness of a metal foil without at least one of said plurality of concavities and convexities; and

an active material provided on both sides of said current collector.

11. (New) The electrode of claim 10 wherein said thickness of said current collector being in a range from 5 and 50  $\mu\text{m}$ .

12. (New) The electrode of claim 10 wherein said thickness of said current collector falls within a range defined by the equation  $t_1 \geq t_2 \geq t_1/4$ , where  $t_1$  is a thickness of an electrode plate and  $t_2$  is the thickness of said current collector.

13. (New) The electrode of claim 10 wherein said thickness of said current collector falls within a range defined by the equation  $d > t_2 \geq d/4$ , where  $d$  is a gap between a pair of dies used to apply said active material to said current collector and  $t_2$  is the thickness of said current collector.

14. (New) The electrode of claim 10 wherein said metal foil is electrolytic nickel foil.

15. (New) The electrode of claim 10 wherein a thickness of a layer of said active material on a front side of said current collector is within  $\pm 30\%$  of a thickness of a layer of said active material on a back side of said current collector.

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16. (New) The electrode of claim 10 wherein a thickness of a layer of said active material on a front side of said current collector is within  $\pm 10\%$  of a thickness of a layer of said active material on a back side of said current collector.

17. (New) An apparatus of producing electrodes for a battery comprising:  
means of processing a metal foil to include at least one of a plurality of concavities and convexities, thereby forming a current collector having a thickness larger than a thickness of the unprocessed metal foil;

means of applying an active material layer on both sides of the current collector using a pair of dies;

means of drying the active material layer; and

means of pressing the active material layer.

18. (New) An apparatus of producing electrodes for a battery comprising:

means of processing a metal foil to include at least one of a plurality of concavities and convexities, thereby forming a current collector having a thickness larger than a thickness of the unprocessed metal foil; and

means of applying an active material on both sides of the current collector using a pair of dies such that the active material flows inside the dies as well as between a tip of each die and the current collector at a shear rate of 500 (1/sec) or less.